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## SUBSCRIPTS vs. COEFFICIENTS

What is the difference? When do we use them?

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We have already discussed the purpose of the subscript in a chemical formula, and we have also examined how it affects how we interpret the formula.

Now, we will introduce a new way of looking at chemical formulae and will learn how to use coefficients to write chemical equations.

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Recall that subscripts are \_\_\_\_\_ numbers that are written to the lower right hand side of the element of which it belongs. For example:

**$\text{CaCl}_2$**  ← Here the subscript '2' refers to the chlorine (Cl) and tells us that there are two chlorine atoms in this compound  
→ The fact that there is no number beside the calcium (Ca) atom infers there is only one calcium atom in the compound

We have also seen that subscripts are applied to all atoms in a compound when brackets are used:

**$\text{Ca}(\text{OH})_2$**  ← here the subscript '2' applies to both the O atom and the H atom inside the brackets.  
→ There is one calcium atom, two oxygen atoms, and two hydrogen atoms in this compound

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A coefficient is a **BIG** number that is written in front of a compound and, unlike a subscript, applies to all atoms in the chemical formula.  
For example:

**$2\text{NaCl}$**  ← Here we have a '2' in front of the formula for sodium chloride. Because coefficients apply to ALL atoms in the formula this tells us that there are two molecules of NaCl  
→ OR if we count atoms, there are two sodium (Na) atoms and two chlorine (Cl) atoms present.

Please complete the following table by calculating the number of atoms in the formula written the way that it is. There will be both subscripts and coefficients that you will have to take into account.

FORMULA	ATOMIC TALLY
3 NaCl	Na: 3 atoms Cl: 3 atoms  Total # Atoms = 6
2 C <sub>6</sub> H <sub>12</sub> O <sub>6</sub>	    Total # Atoms =
4 CH <sub>3</sub> COOH	    Total # Atoms =
10 C <sub>4</sub> H <sub>10</sub>	    Total # Atoms =
3 Ba(NO <sub>3</sub> ) <sub>2</sub>	    Total # Atoms =
5 Al <sub>2</sub> (CO <sub>3</sub> ) <sub>3</sub>	    Total # Atoms =